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EXAMINER	
PAPPAS, PETER	

ART UNIT	PAPER NUMBER
2671	8

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 10/080,525	Applicant(s) SHEKTER, JONATHAN	
	Examiner Peter-Anthony Pappas	**Art Unit** 2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2/21/2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the steps of simultaneously anti-aliasing, motion-blurring and depth-of-field blur must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1, 6, 9, 22, 26, 29 and 42 are objected to under 37 CFR 1.75(d). Said claims are unclear, failing to distinctly claim the subject matter which the applicant regards as his invention or discovery.

3. In regards to claims 1, 6, 9, 22, 26, 29 and 42 the following language is considered unclear: "...3-D object's color, depth, coverage, transfer mode, and rate of change of depth, or surface geometry information." Said language is considered unclear, because said language can be interpreted in more then one way, which renders the meaning of said language unclear. Said language can be read as comprising [color, depth, coverage, transfer mode, and rate of change of depth] or [surface geometry information]; or comprising [color, depth, coverage, transfer mode] or [rate of change of depth or surface geometry information].

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 6, 9, 22, 26, 29 and 42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention (page 5, lines 25-30, and page 6, lines 1-6).

However, it is noted that claims 1, 6, 9, 22, 26, 29 and 42 as disclosed in the original application are considered to be supported by the specification, because said claims as disclosed in their original form are in fact considered part of said specification. Applicant is advised to amend said claims to include the original limitations and to amend said original specification to meet 37 CFR 1.75(d).

Allowable Subject Matter

6. Claims 14, 19, 22-25, 34, 39 and 42-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. In regards to claims 14 and 34 the prior art of record does not anticipate or suggest a system comprising the limitation of using depth and surface geometry information for the one or more 3-D objects to extend, on an output buffer pixel basis,

the surfaces of the one or more 3-D objects into an extended output buffer pixel, in combination with the other claim limitations, respectively.

8. In regards to claims 19 and 39 the prior art of record does not anticipate or suggest a system comprising the limitation of determining the number and volume of each uniquely layered space-time region, wherein the volume of a uniquely layered space-time region is calculated for the portion of the output buffer pixel and the portion of the shutter interval occupied by the space-time region, in combination with the other claim limitations, respectively.

9. In regards to claims 22 and 42 the prior art of record does not anticipate or suggest splitting a plurality of scan-converted 3-D objects into one or more non-interacting object clusters, wherein said non-interacting object clusters comprise of a cluster of objects that do not interact with each other or with any other cluster of objects and wherein said object clustering can be performed using any known clustering technique such as bounding boxes, wherein the bounds of said bounding boxes are determined by the respective maximum and minimum properties of the respective objects bound within said bounding boxes.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-12, 16-17, 26-33 and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin (Patent No. 5, 990, 904), in view of Pearce et al. (Patent No. 5, 809, 210).

12. In regards to claim 1, in light of the respective 35 U.S.C. 112 rejection and the applicant's admitted statements (Remarks, page 2, lines 5-8), the original interpretation of said claim language is upheld.

Griffin teaches a system and method for merging pixel fragments, wherein said system includes a rasterizer, a pixel engine, a pixel buffer and a fragment buffer. Geometric primitives are rasterized (scan-converted) to generate pixel data, including pixel fragments. Said fragment buffer stores color, depth, and coverage data for partially covered pixels. If pixel fragments are generated for a given pixel location (per pixel), the pixel buffer element corresponding to that location stores a pointer to the head of a list of the pixel fragments in the fragment buffer (column 4, lines 66-67, and column 5, lines 1-26; column 19, lines 14-20; Fig. 2).

In regards to coverage Griffin teaches said system supports a wide range of interactive applications, wherein its ability to support advanced real time animation makes it well-suited for games, educational applications, and a host of interactive applications (column 7, lines 1-4). Griffin fails to explicitly teach coverage, as read in light of the specification. Pearce et al. teaches the sampling model simulates an instantaneous shutter on a video camera. However, this form of sampling is satisfactory with scenes of low and moderate action, because unpleasant stroboscopic effects (e.g., jerkiness) are evident when rapidly moving objects are present. This results since

computer generated animation lacks the real-world motion blur of a moving object (column 1, lines 20-28). In the present invention, motion blur simulation for an exposure interval is provided by analyzing the movement of tessellated representations of surfaces relative to a stationary sampling point on a pixel (column 1, lines 44-47). For example, consider FIG. 3 which illustrates the movement of a polygon 302 between the S_{open} (shutter open) and S_{closed} (shutter close) positions. During an intermediate period of time, polygon 302 covers pixel 310. An estimate of the time that polygon 302 covers pixel 310 can be provided by temporal sampling at one or more sampling points 312 (column 4, lines 23-33).

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to use motion blurring in (video) games, in a manner in which to improve the quality of the animations in said (video) games. Griffin is directed to (video) games and it would have been well known to one skilled in the art, at the time of the applicant's invention, to use animation in (video) games. Pearce et al. discloses using a specific coverage technique, involving shutter exposure times, as an element of a motion blurring technique to improve the quality of animations. Thus, it would have been obvious to combine the motion blurring technique disclosed by Pearce et. al with animation, within a (video) game environment, so to allow for a better quality of animation to be presented.

In regards to transfer mode Griffin teaches the scan convert block (rasterizer) in the tiler generates instances of pixel data representing: 1) fully covered, opaque pixels; 2) fully covered translucent pixels; 3) partially covered, opaque pixels; or 4) partially

covered, translucent pixels (column 35, lines 48-52). Additionally, Griffin teaches Pixel engine 406 performs pixel level calculations including blending, and depth buffering (column 19, lines 14-20).

It is noted that applicant discloses transfer mode is also known as blend mode (specification, page 6 paragraph 4). Blending consists of color transformations, wherein a plurality of colors can be combined via a plurality of means, and consists of such properties as opacity and translucency. Thus, the expectations of the claim are considered to be met.

In regards to rate of change of depth (slope) and surface geometry information (geometry orientation) Griffin teaches the scan convert engine 398 scan converts polygons, which in this case are triangles, and transfers pixel data to the pixel engine 406 (column 18, lines 42-47; column 19, lines 14-20). The texture filter engine 400, which receives input from said scan convert engine 398 post scan conversion, calculates pixel color and alpha data for polygons that are being rendered. The illustrated texture filter engine computes a filter kernel based on the Z-slope and orientation of the triangle being rendered, and on the center of the texture request (column 18, lines 48-62; Fig. 9A-9C).

13. In regards to claim 2 the rationale disclosed in the rejection of claim 1 is incorporated herein.

14. In regards to claim 3 Griffin teaches the pixel engine performs a depth compare operation on newly generated pixel data. If a generated pixel is occluded by the pixel in the pixel buffer, it is discarded. If the generated pixel is a fully covered pixel and is not

occluded by the pixel in the pixel buffer, it replaces the pixel in the pixel buffer (column 5, lines 26-31).

15. In regards to claim 4 Griffin teaches the image processing board 174 renders images and transfers display images to a display device 142, wherein said display device 142 in one embodiment is a cathode ray tube (CRT) device, but it can also be a liquid crystal display (LCD) device, or some other form of display device (column 13, lines 39-67; column 12, lines 39-49; column 11, lines 23-27). It is noted said CRT and LCD display devices are considered to display graphical data in two dimensions.

The memory management of the fragment buffer is performed using a linked list structure (column 34, lines 44-46). Multiple fragment buffer entries can be associated with a single pixel (via a linked list mechanism) for cases in which multiple polygons (for a given object) have partial coverage for the same pixel location (column 34, lines 33-41).

16. In regards to claim 5 the rationale disclosed in the rejection of claim 4 is incorporated herein. Griffin teaches that a 4x4 pixel coverage bitmask, for each pixel which is partially covered, is stored in a fragment buffer, wherein the computation of said coverage bitmask is a two step process involving edge slope (surface geometry) and depth information (column 34, lines 47-67, and column 35, lines 1-20). Said coverage bitmask itself is considered a geometric object.

17. In regards to claim 6 the rationale disclosed in the rejection of claim 4 is incorporated herein. It is noted that said system is considered to perform the method. Griffin teaches that in the context of 3-D graphics, the rendering process includes

transforming the graphical models in a scene, and rasterizing the geometric primitives in the models to generate pixel data (column 2, lines 1-4). The surface elements are referred to as geometric primitives (column 1, lines 61-63).

18. In regards to claim 7 the rationale disclosed in the rejection of claim 3 is incorporated herein. It is noted that each of the pixel fragments, in depth sorted order, are inserted into the motion buffer.

19. In regards to claim 8 each fragment buffer entry includes a pointer to the next fragment buffer entry (column 34, lines 47-63).

20. In regards to claim 9 the rationale disclosed in the rejection of claim 4 is incorporated herein. It is noted that said system is considered to perform the method. Additionally, it is noted that the various elements comprising said motion buffer, previously disclosed in this Office Action, are illustrated as being received in step 210 of Fig. 4A by the Alpha and Color Buffers.

21. In regards to claim 10 Griffin teaches Griffin scan convert block 394 includes the interpolators for walking edges and evaluating colors, depths, etc. The pixel address along with color and depth, and anti-aliasing coverage information is passed to the pixel engine for processing (column 18, lines 42-47). Pixel engine 406 performs pixel level calculations including blending, and depth buffering. The pixel engine also handles Z-comparison operations required for shadows. To achieve optimal performance, the pixel engine should preferably operate at one pixel per clock cycle (column 19, lines 14-20).

It is noted that the use Z comparison operations are considered to result in sorting biased by a depth (Z) value. In addition, it is noted, that shadows are considered an effect of the blending of color.

22. In regards to claim 11 Griffin teaches support for double buffering and dual ported buffers (column 19, lines 33-43; column 39, lines 38-54). It is noted that performing anti-aliasing or any other effect simultaneously while compositing a 3D object is considered to read on the real time application of said effect while rendering.

23. In regards to claim 12 Griffin teaches rasterizing refers generally to the process of computing a pixel value for a pixel in the image being rendered based on data from the geometric primitives that project onto or "cover" the pixel (column 2, lines 39-44). Fragment resolution is the process during which all of the fragments for a pixel are combined to compute a single color and alpha value. This single color and alpha are written into the color buffer (column 41, lines 53-66). Computing the resolved color includes accumulating a correctly scaled color contribution from each layer while computing and maintaining coverage information with which to scale subsequent layers (column 42, lines 1-4). Griffin fails to teach a weighted average of the blended colors. Pearce et al. teaches to determine the color value of pixel 200, a weighted or unweighted average of the color values of each of pixel sampling points 211-219 (and possibly including sample points from neighboring pixels) is determined (column 3, lines 60-67, and column 4, lines 1-2).

It would have been well known to one skilled in the art, at the time of the applicant's invention, to use motion blurring in (video) games, in a manner in which to

improve the quality of the animations in said (video) games. Griffin is directed to (video) games and it would have been well known to one skilled in the art, at the time of the applicant's invention, to use animation in (video) games. Pearce et al. discloses using a specific coverage technique, utilizing weighted or unweighted average of the color values of each of pixel sampling points, as an element of a motion blurring technique to improve the quality of animations. Thus, it would have been obvious to combine the motion blurring technique disclosed by Pearce et. al with animation, within a (video) game environment, so to allow for a better quality of animation to be presented.

24. In regards to claim 16 the rationale disclosed in the rejection of claim 1 is incorporated herein.

25. In regards to claim 17 the rationale disclosed in the rejection of claim 12 is incorporated herein. Griffin fails to explicitly teach determining the number of time periods during the shutter interval in which the one or more 3-D objects are uniquely layered, and the duration if each uniquely layered time period. Pearce et al. teaches the present invention determines the interval of time that polygon 302 contains sampling point 312 by identifying the points in the time domain that the sampling point 312 is inside or touches the edges of polygon 302 (column 4, lines 44-49).

It would have been well known to one skilled in the art, at the time of the applicant's invention, to use motion blurring in (video) games, in a manner in which to improve the quality of the animations in said (video) games. Griffin is directed to (video) games and it would have been well known to one skilled in the art, at the time of the applicant's invention, to use animation in (video) games. Pearce et al. discloses using a

specific coverage technique, wherein said coverage is time dependent, as an element of a motion blurring technique to improve the quality of animations. Thus, it would have been obvious to combine the motion blurring technique disclosed by Pearce et. al with animation, within a (video) game environment, so to allow for a better quality of animation to be presented.

26. In regards to claim 26 the rationale disclosed in the rejection of claim 6 is incorporated herein. Griffin teaches that the graphics support software 160 can include functions to support memory management, view volume culling, depth sorting, chunking, as well as gsprite allocation, transformation, and level of detail. The graphics support software can include a library of graphics functions, accessible by graphics applications, to perform the functions enumerated here (column 12, lines 11-16).

27. In regards to claim 27 the rationale disclosed in the rejection of claim 7 is incorporated herein.

28. In regards to claim 28 the rationale disclosed in the rejection of claim 8 is incorporated herein.

29. In regards to claim 29 the rationale disclosed in the rejection of claim 9 is incorporated herein. Griffin teaches that the graphics support software 160 can include functions to support memory management, view volume culling, depth sorting, chunking, as well as gsprite allocation, transformation, and level of detail. The graphics support software can include a library of graphics functions, accessible by graphics applications, to perform the functions enumerated here (column 12, lines 11-16).

30. In regards to claim 30 the rationale disclosed in the rejection of claim 10 is incorporated herein.

31. In regards to claim 31 the rationale disclosed in the rejection of claim 11 is incorporated herein.

32. In regards to claim 32 the rationale disclosed in the rejection of claim 12 is incorporated herein.

33. In regards to claim 33 the rationale disclosed in the rejection of claim 13 is incorporated herein.

34. In regards to claim 36 the rationale disclosed in the rejection of claim 16 is incorporated herein.

35. In regards to claim 37 the rationale disclosed in the rejection of claim 17 is incorporated herein.

36. Claims 13, 15, 18, 20, 35, 38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin (Patent No. 5, 990, 904) and Pearce et al. (Patent No. 5, 809, 219), as applied to claims 1-12, 16-17, 26-33 and 36-37, in view of Deering (Patent No. 6, 426,755).

37. In regards to claim 13 the rationale disclosed in the rejection of claim 11 is incorporated herein. Griffin and Pearce et al. fail to explicitly teach the real time (simultaneous) application of depth of field blurring. Deering teaches since these effects (i.e. depth of field blur and transparency) tend to be highly dependent upon viewpoint location, the lack of hardware capable of performing these effects in real time prevents applications such as 3D games and simulators from taking full advantage of

these effects. Advantageously, this configuration allows the graphics system to generate high quality images and to selectively apply one or more of the effects described above (e.g., motion blur, depth of field, and screen door-type transparency) in real time (column 3, lines 13-30).

It would have been obvious one skilled in the art, at the time of the applicant's invention, to incorporate a real time depth of field blur technique into games, so to improve the visual quality and the level of realism in said games, as taught by Deering into the system as taught by Griffin and Pearce et al., because by incorporating and applying said real time depth of field blur technique one would be able to achieve a higher quality of animation and visual presentation, which is more life as it is able to be processed and applied in real time.

38. In regards to claim 15 the rationale disclosed in the rejection of claim 13 is incorporated herein. Griffin and Pearce et al. fail to explicitly teach the real time (simultaneous) application of anti-aliasing and depth of field blurring.

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to implement simultaneous anti-aliasing and depth of field blurring in a system that supports double buffering and dual ported buffers, as taught by Griffin and Pearce et al., because through the use of said double buffering and dual ported buffers it would allow for the parallel (simultaneous) accessing of relevant pixel data required for the processing anti-aliasing and depth of field blurring and therefore allow for a possible in processing latency in a given graphics pipeline.

39. In regards to claim 18 Griffin and Pearce et al. fail to explicitly teach the real time (simultaneous) application of anti-aliasing and motion blur.

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to implement simultaneous anti-aliasing and motion blur in a system that supports double buffering and dual ported buffers, as taught by Griffin and Pearce et al., because through the use of said double buffering and dual ported buffers it would allow for the parallel (simultaneous) accessing of relevant pixel data required for the processing anti-aliasing and motion blur and therefore allow for a reduction in processing latency in a given graphics pipeline.

40. In regards to claim 20 Griffin and Pearce et al. fail to explicitly teach the real time application (simultaneous) of motion blur and depth of field blur.

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to allow for the simultaneous motion blur and depth of field blur in a system that supports double buffering and dual ported buffers, as taught by Griffin and Pearce et al., because through the use of said double buffering and dual ported buffers would allow for the parallel (simultaneous) accessing of relevant pixel data needed for the processing of each as both techniques are support by said system.

41. In regards to claim 35 the rationale disclosed in the rejection of claim 15 is incorporated herein.

42. In regards to claim 38 the rationale disclosed in the rejection of claim 18 is incorporated herein.

43. Claims 21 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin (Patent No. 5, 990, 904), Pearce et al. (Patent No. 5, 809, 219) and Deering (Patent No. 6, 426,755), as applied to claims 13, 15, 18, 20, 35, 38 and 40, in view of Foley et al. (Computer Graphics: Principles and Practice).

44. In regards to claim 21 Griffin, Pearce et al. and Deering fail to explicitly teach simultaneously anti-alias, motion-blur and depth-of-field blur. Foley et al. al. teaches that multiprocessing has two basic forms: pipelining and parallelism, wherein said two basic forms are comprised of processing elements arranged serially and in parallel, respectively (p. 874-875). It is noted that said two basic forms are considered able to perform the actions designated by their respective processing elements simultaneously.

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to implement anti-aliasing, motion-blur and depth-of-field blur via one of said multiprocessing approaches, as taught by Foley et al., because it is conventional to implement, for example, said pipelined approach, as taught by Foley et al., in a graphics systems, wherein said anti-aliasing, motion-blur and depth-of-field blur would be considered processing elements. Therefore, in said pipelined system pixels undergoing processing would be processed by said processing elements simultaneously.

45. In regards to claim 41 the rationale disclosed in the rejection of claim 21 is incorporated herein.

Response to Amendment

46. The amendment filed 3/26/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment

shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "...3-D object's color, depth, coverage, transfer mode, and rate of change of depth, or surface geometry information."

Applicant is required to cancel the new matter in the reply to this Office Action.

47. In response to applicant's remark that Group II, as amended, precludes a restriction requirement, Groups I and II have thus been rejoined and the restriction requirement withdrawn.

48. In response to applicant's remarks in regards to an IDS filed on October 23, 2002 the only received IDS of record, dated July 31, 2002, was initialed and included with the prior office action.

49. In response to applicant's remarks in regards to the clarification of claims 1, 5, 6, 9, 26 and 29 see the above respective 35 U.S.C. 112 1st paragraph claim rejection and 37 CFR 1.75(d) claim objection.

50. In response to applicant's remarks that Griffin fails to each or suggest preserving the surface geometry information or rate of change of depth of 3-D objects after they have been scan converted, as per the rationale disclosed in the rejection of claim 1 above, Griffin teaches surface geometry information and rate of change of depth are calculated from data post scan conversion. Thus, said calculated geometry information and rate of change of depth data are considered to be stored post scan conversion.

51. In response to applicant's remarks that said surface geometry information and rate of change of depth are not stored within said fragment buffer. Both Griffin and the

applicant teach said fragment buffer includes a Z (depth) entry and coverage bitmask entry M. See the rationale disclosed in the rejection of claims 1 and 5, respectively. Additionally, it is noted as per the above respective 35 U.S.C. 112 1st paragraph claim rejection and 37 CFR 1.75(d) claim objection that it is now unclear as to whether both surface geometry information and rate of change of depth are required to both be stored in the same data structure.

52. In response to the applicant's remarks that Pearce et al. fails to disclose storing the surface geometry information or rate of change of depth of a 3-D object after it has been scan converted said remarks are considered moot as said limitations are shown to be taught by Griffin, as disclosed in the rejection of claim 1.

Conclusion

53. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: "The A-buffer, an Antialiased Hidden Surface Method" (Computer Graphics, Vol. 18, No. 3, 1984) referred to as Carpenter. Carpenter discloses a software based anti-aliased, area-averaged, accumulation buffer in which two data types, representing pixel data, are defined: pixelstruct – used to store depth and a pointer or depth, color and coverage; fragment – used to store a pointer, color, opacity, area, an object tag, a pixel mask and a positive range of Z vales.

54. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 703-305-8984. The examiner can normally be reached on M-F 10:00am-7:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 703-305-9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter-Anthony Pappas
Examiner
Art Unit 2671

PAP

Mark Zimmerman

MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
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